



# Bridging Science and Faith: Needs Analysis for an E-Module Based Socio-scientific Issues with Qur'anic-Hadith Integration in Junior High Schools

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## ABSTRACT

*In science education, students are expected not only to acquire scientific knowledge but also to comprehend socio-scientific issues within their societal contexts and recognize the natural order of the universe as a manifestation of Allah SWT's divine power. This study aimed to: 1) identify learning resources currently used by students to understand Earth's layers and natural disasters; 2) determine the types of learning resources that require development for science instruction; and 3) analyze the needs for developing a Socio-Scientific Issues (SSI)-based e-module integrated with Qur'anic verses and Hadiths. Employing a Research and Development (R&D) methodology adapted from Borg and Gall, data were collected through online questionnaires administered to 20 seventh-grade students at MTs An Najah Pekanbaru. Qualitative descriptive analysis revealed three key findings: 1) Primary learning resources included textbooks, student worksheets, and animated videos, 2) E-modules were identified as necessary for enhancing comprehension of Earth's layers and disasters, and 3) While 100% of students had never used SSI-based e-modules, 95% had prior exposure to learning materials integrating Qur'anic verses and Hadiths. These results underscore the demand for faith-integrated digital resources that bridge science education with Islamic perspectives.*

**Keywords:** *needs analysis, e-module, socio-scientific issues (SSI), Qur'an-Hadith integration*

## 1. INTRODUCTION

Education transcends mere knowledge transfer; it is a comprehensive endeavor to cultivate individuals of character, intellect, and resilience. Through structured learning processes, education enables students to develop their full potential—not only academically but also spiritually, emotionally, and morally, as mandated by Indonesia's Law No. 20 of 2003. In an era of rapid technological transformation, education's role becomes even more pivotal: to equip younger generations with adaptive capabilities, critical thinking skills, and the capacity to contribute meaningfully to society and the nation (Darmayasa et al., 2018). Education serves as a fundamental pillar for national progress, making it imperative to prepare generations capable of adapting to existing conditions.

Beyond being the cornerstone of national development, education dynamically progresses through continuous innovation. Technological breakthroughs have become the main catalyst for this transformation, driving comprehensive digitalization that reshapes curricula, pedagogical approaches, and learning ecosystems—enabling education systems to respond to global shifts (Rahayu et al., 2021). Such digital integration not only optimizes learning efficacy but also provides solutions for modern educational demands (Jamun, 2018; Putri et al., 2019).

Particularly in Indonesia, when pandemic COVID-19 happened, it forced schools and universities to close physical classrooms, disrupting traditional learning methods. This crisis accelerated the adoption of technology in education as the only viable solution to continue teaching and learning. Platforms like Zoom, Google Classroom, and LMS (Learning Management Systems) became essential tools, transforming homes into virtual classrooms overnight. During and post the COVID-19 pandemic, educators have increasingly developed digital learning media to facilitate the achievement of learning objectives. Furthermore, technology integration in education has proven effective in enhancing student motivation, enthusiasm, interest, and engagement throughout the learning process.



Within this context, learning media has emerged as a crucial and integral component, particularly in science education. Among various media formats, modules stand out as particularly effective instructional tools. A well-designed module serves as a systematic and engaging learning resource that incorporates comprehensive content, methodologies, learning boundaries, and evaluation systems, all structured to help students achieve competencies appropriate to their cognitive levels (Direktorat Pembinaan SMA, 2008).

One prominent example is the widespread adoption of electronic modules (e-modules), which have proven to be more than just an emergency solution during lockdowns. Unlike traditional textbooks, e-modules offer dynamic features such as embedded videos, interactive quizzes, and hyperlinks to supplementary resources—enhancing student engagement and self-paced learning (Linda et al., 2021).

The sustainability of e-modules post-pandemic highlights several key advantages: (1) accessibility, allowing real-time updates and offline access to address infrastructure gaps in remote areas (Jamun, 2018; Putri et al., 2019); (2) pedagogical innovation through multimedia and socio-scientific issues (SSI) integration, fostering critical thinking as a core 21st-century skill (Sadler & Zeidler, 2005); and (3) eco-friendliness by drastically reducing paper use, aligning with global sustainability goals (Midroro et al., 2022). Furthermore, e-modules not only fulfill self-instructional and adaptive characteristics (Linda et al., 2021) but also address the demands of 21st-century learning by emphasizing student independence (Harefa & Silalahi, 2020).

The advancement of educational technology has given rise to digitally accessible learning modules, known as electronic modules (e-modules). An e-module is considered interactive when it facilitates dynamic user engagement through multimedia elements such as visuals, typography, color variations, animations, and embedded videos. According to Linda et al. (2021), e-modules are characterized by their self-instructional, self-contained, stand-alone, adaptive, and user-friendly design. These features not only enhance the learning process but also foster independent learning skills—a critical competency in 21st-century education (Harefa & Silalahi, 2020).

The rapid growth of technology and the need for teaching materials that align with curricular demands call for innovative approaches. Two key frameworks are particularly relevant. First, Socio-Scientific Issues (SSI): Sadler & Zeidler (2005) define SSI as science-based dilemmas that spark social debate (e.g., environmental challenges like Earth's layers and natural disasters). SSI encourages students to critically analyze real-world problems, bridging science and societal contexts (Anagun & Ozden, 2010). Second, Islamic Integration: Combining scientific concepts with Islamic principles fosters holistic learning, emphasizing the harmony between faith and empirical knowledge.

SSI-based e-modules serve three primary functions in science education: 1) Providing contexts for students to explore the relevance of science, 2) Demonstrating the interplay between scientific concepts and daily life, and 3) Cultivating student interest and motivation in science (Anagun dan Ozden, 2010).

Islamic integration in education serves as a spiritual foundation for learners, emphasizing the divine imperative to seek knowledge. This principle is exemplified in Quranic verses such as Al-Mujadalah 11, where Allah elevates those who possess knowledge (Q.S. 58:11).

يٰۤاَيُّهَا الَّذِيْنَ ءَامَنُوْا اِذَا قِيْلَ لَكُمْ تَفَسَّحُوْا فِى الْمَجْلِسِ فَاَفْسَحُوْا يَفْسَحَ اللّٰهُ لَكُمْ ۗ وَاِذَا قِيْلَ اَنْشُرُوْا فَاَنْشُرُوْا يَرْفَعِ اللّٰهُ الَّذِيْنَ ءَامَنُوْا مِنْكُمْ وَالَّذِيْنَ اٰتَوْا الْعِلْمَ ۗ اُتُوْا بِالْحَقِّ ۗ وَاللّٰهُ بِمَا تَعْمَلُوْنَ خَبِيْرٌ

Meaning: *O you who have believed, when you are told, 'Make space in gatherings,' then make space; Allah will make space for you. And when you are told, 'Rise up,' then rise up. Allah will elevate those among you who have believed and those who were given knowledge by degrees. And Allah is fully aware of what you do.*

The verse underscores that scientific pursuit, when aligned with faith, becomes an act of worship that elevates one's spiritual and intellectual stature before Allah.

The synthesis of science and Islam, though challenging due to their perceived dichotomy (Fajar & Habibulloh, 2021), creates an interdisciplinary framework unifying Islamic studies, natural sciences, and



humanities (Zain & Vebrianto, 2017). This integration rejects the false binary between empirical inquiry and spiritual truth, demonstrating that both domains share fundamental methodologies—observation, experimentation, and analysis of natural phenomena.

Natural science (IPA) studies worldly phenomena, yet its deeper purpose lies in recognizing divine order (Latifah & Ratnasari, 2016). The observable harmony in the universe—from planetary motion to ecological balance—serves as tangible evidence of Allah's omnipotence. Thus, science education becomes a means to strengthen faith, connecting material logic with spiritual transcendence. This paradigm requires students to master scientific concepts while contextualizing them within social issues (e.g., environmental crises) and Islamic values. For instance, studying Earth's layers and disasters (e.g., earthquakes, volcanic activity) becomes an opportunity to analyze geological phenomena scientifically, discuss their societal impacts, and reflect on Quranic teachings about environmental stewardship and divine power.

The “Earth’s Layers and Disasters” unit exemplifies this integration. Students explore plate tectonics not merely as geological theory, but as a manifestation of Allah's power (Q.S. 27:88) while examining real-world issues like disaster mitigation. By linking atmospheric studies to Quranic references about water cycles (Q.S. 23:18), learning transcends rote memorization to foster eco-consciousness rooted in Islamic ethics.

The aforementioned discussion highlights that science education should not be limited to the mere acquisition of scientific knowledge. Students are also expected to comprehend the social dimensions of scientific issues and recognize the inherent order in the universe as a manifestation of Allah’s power (Q.S. 3:190-191). This integrated approach serves a dual purpose: strengthening faith in the Creator while cultivating an Islamic worldview. Through this lens, scientific phenomena become signs (*ayat*) of divine wisdom, fostering both intellectual and spiritual growth. The topic of Earth’s layers and natural disasters was strategically chosen for its pedagogical relevance and social significance.

This study aims to achieve three primary objectives: (1) to identify the learning resources currently utilized by students in comprehending Earth's layers and natural disasters topics, (2) to determine which learning resources require development for enhanced science education, and (3) to conduct a needs analysis for developing an e-module based on Socio-Scientific Issues (SSI) that integrates relevant Qur’anic verses and Hadiths. The research seeks to bridge scientific concepts with Islamic perspectives through technology-enhanced learning materials, specifically targeting junior high school science curriculum requirements. By examining existing resources and identifying gaps, this study will establish the foundational framework for creating an interdisciplinary e-module that connects earth science education with ethical and religious considerations through the SSI approach.

## 2. METHODS

This study employed a Research and Development (R&D) methodology, adopting the developmental model proposed by Borg & Gall (1983). According to Borg & Gall (1983), educational development research constitutes a systematic process for both creating and validating educational products (Setyosari, 2013). The implementation of this model followed an iterative cyclical procedure, encompassing distinct developmental stages that allowed for continuous refinement and validation of the educational output. This approach was particularly suitable for the current study’s objective of developing an innovative SSI-based e-module integrated with Islamic scriptures, as it provided a structured framework for product design, evaluation, and improvement through multiple cycles of development.

In their seminal work, Borg & Gall (1983) proposed a ten-stage Research and Development (R&D) methodology (Gustiani, 2019), consisting of: (1) Research and Information Collection, (2) Planning, (3) Developing Preliminary Product Form, (4) Preliminary Field Testing, (5) Main Product Revision, (6) Main Field Testing, (7) Operational Product Revision, (8) Operational Field Testing, (9) Final Product Revision, and (10) Dissemination and Implementation. However, this current study adapted the model by focusing exclusively on the preliminary study phase, specifically conducting needs analysis of science learning resources from two critical



perspectives: existing educational policies and student requirements. This modified approach allowed for targeted investigation of the foundational requirements before proceeding to product development stages.

This study targeted seventh-grade students at MTs (Islamic Junior High School) as its population, with a sample of 20 seventh-grade students from MTs An Najah Pekanbaru selected to provide the required data. Data collection employed two primary techniques: (1) policy document analysis, involving the review of relevant educational policies, and (2) questionnaire distribution to the student sample. The collected policy documents were analyzed using descriptive techniques, while student questionnaire responses were processed through percentage-based analysis to quantify trends and preferences. This dual-method approach ensured comprehensive data triangulation for assessing learning resource needs in science education

The instrument related to policy document analysis used a document review sheet. The aspects analyzed included the expected graduation standards and science learning standards for junior high schools or madrasahs. A student needs analysis questionnaire was distributed online using the Google Forms platform. The indicators and aspects used for assessment to obtain data for the needs analysis were: (1) students' responses to science learning, (2) media used, (3) experience using e-modules, (4) the learning system used by science teachers, (5) students' needs for the development of e-modules based on socio-scientific issues (SSI) integrated with verses from the Qur'an and hadith, (6) students' responses to the development of the e-module, and (7) the preferred media.

### **3. RESULTS & DISCUSSION**

#### **3.1 Policy Document Analysis**

Based on the Government Regulation of the Republic of Indonesia Number 57 of 2021 on National Education Standards, there is a need to develop various types of learning resources to support science instruction at the junior secondary school level (SMP/MTs). The regulation emphasizes that national education standards are being refined in a planned, directed, and sustainable manner to enhance the quality of education. This refinement aims to ensure that educational practices align with the evolving demands of local, national, and global changes. Therefore, the development of science learning resources should focus on meeting these standards, supporting students' needs, and preparing them to face future challenges in a dynamic world.

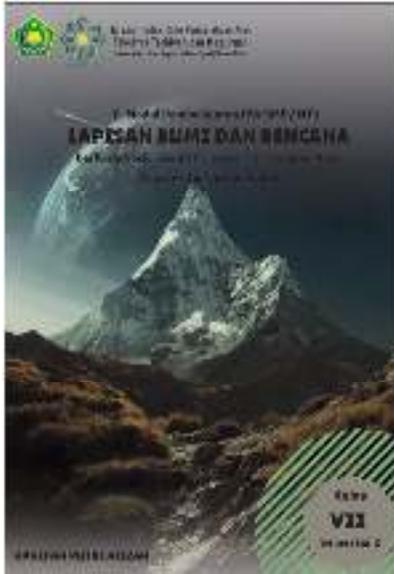
The findings presented in the document highlight the key components of Natural Science (IPA) education at the junior secondary level as outlined by the Agency for Standards, Curricula, and Assessment of Education under the Ministry of Education, Culture, Research, and Technology. According to the Merdeka Curriculum, science education is structured around two main elements: scientific understanding and scientific process skills. Scientific understanding involves mastering core scientific concepts and applying higher-order thinking skills, while scientific process skills focus on the ability to conduct scientific inquiry through observation, investigation, data analysis, and communication. This approach aims to develop students' scientific literacy and critical thinking, preparing them to address real-world problems through evidence-based reasoning and inquiry-based learning.

The findings refer to the Decree of the Minister of Religious Affairs of the Republic of Indonesia Number 347 of 2022, which provides guidelines for the implementation of the Merdeka Curriculum in madrasahs. According to this decree, the Graduate Competency Standards are outlined with several key components. Students are expected to demonstrate the ability to present original ideas, create innovative actions or works according to their capacity, and habitually seek alternative actions when facing challenges. They should also be able to identify, analyze, and absorb relevant information regarding problems they encounter in order to obtain appropriate alternative solutions. Furthermore, students are encouraged to exhibit virtuous and moderate behavior (*akhlaqul karimah*) in their daily lives, within family, community, and digital environments, based on a sound understanding of the Qur'an and Hadith as taught by authentic scholars.



### 3.2 Student Needs Analysis Questionnaire

This research was conducted by distributing needs analysis questionnaires directly in the form of sheets to seventh-grade students at MTs An Najah Pekanbaru. Previously, students were given an overview of the e-module to be developed so they could provide responses regarding the needs analysis for e-module development. The overview given to the students was in the form of a PDF file containing parts of the module.



**Figure 1. E-Module Cover**

The cover displays the e-module's title, target class, and writing team. Its background uses an image relevant to the e-module's subject.



**Figure 2. A Conceptual Diagram Summarizing Earth's Layers and Related Natural Disasters**

Figure 2 displays a conceptual diagram of Earth's layers and disasters, covering: Earth's structural layers (atmosphere, lithosphere, hydrosphere), earthquakes, volcanic activity, and associated disaster risk reduction strategies. This visualization aids students in grasping the material's organizational framework.



**Figure 3. Socio-Scientific Issues in Earth's Compositional Layers**

Figure 3 presents a news excerpt or issue related to Earth's layers and disasters, connected to a current trending topic in society.



**Figure 4. Integration of Qur'anic Verses and Hadith in the Study of Earth's Compositional Layers**

Figure 4 presents an excerpt of material integrated with Qur'anic verses and Hadith. This integration is based on Qur'anic and Hadith discussions related to the content presented in the e-module.



Figure 5. Summary and Exercises

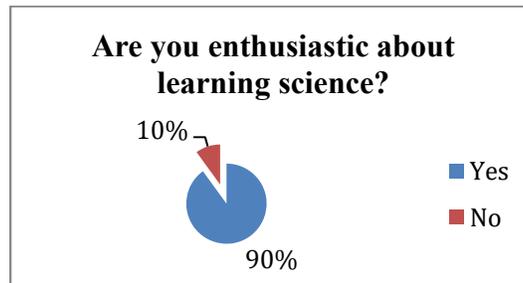
Figure 5 displays the summary and exercises related to the material covered in the e-module. The summary contains brief explanations of key concepts from each lesson, while the exercises are designed to help students evaluate their level of understanding after studying the e-module content.



Figure 6. Glossary

Figure 6 presents the glossary section. The glossary contains a list of key terms with their definitions related to specific concepts. In this case, the glossary includes terminology that appears throughout the e-module, providing clear explanations to help students better understand the material.

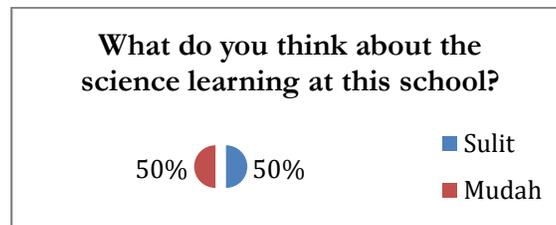
The seventh-grade students at MTs An Najah Pekanbaru engage in offline (face-to-face) learning. This offline learning system implemented in science education has generated several positive responses. Students' enthusiasm in science learning is clearly demonstrated in Figure 7.



**Figure 7. Diagram of Students' Responses to Science Learning**

Figure 7 shows that 90% of students stated they were enthusiastic about the implementation of science learning conducted in the classroom. The students' enthusiasm for science learning is due to the fact that science allows them to engage in hands-on learning experiences to find answers directly from the source or to discover answers from their environment (experimentation). According to Marleni (2016), students with high interest in learning will have a strong curiosity about how to search for or solve problems. This is also supported by Dalimunthe et al. (2021), who state that students' enthusiasm is influenced by their personal desire to learn, as not all students are able to absorb knowledge from every lesson delivered by teachers.

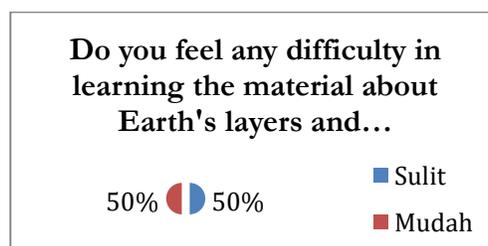
However, on the other hand, students also encounter difficulties in science learning. This can be seen in Figure 8.



**Figure 8. Diagram of Students' Responses to Difficulties Experienced in Science Learning**

Figure 8 shows that 50% of students stated that science is a subject that is difficult to understand, while the other 50% stated that science is an easy subject. One of the main factors causing students to experience difficulties in learning science is their lack of interest, as the subject involves many formulas and explanations, making it difficult to memorize, hard to understand, and challenging to grasp. Some students feel they are not good at this subject, and they view science as a collection of terms that gives them headaches and makes them reluctant to study. They prefer to spend their time learning other subjects or playing with friends instead of studying science (Yunarti, 2021).

These obstacles experienced by students impact the overall science learning process. One example is in the topic of Earth's layers and natural disasters. This topic is known for containing a lot of material that must be memorized. Although it does not involve formulas, the concepts are difficult to visualize because they cannot be observed directly, making it hard for some students to imagine the structure of the Earth and the nature of potential disasters. This is further illustrated in Figure 9.





### Figure 9. Diagram of Students' Responses to the Learning of Earth's Layers and Natural Disasters

To address this issue, science teachers usually require learning resources to support the science learning process. The learning resources used by science teachers in teaching the topic of Earth's layers and natural disasters can be seen in Figure 10.

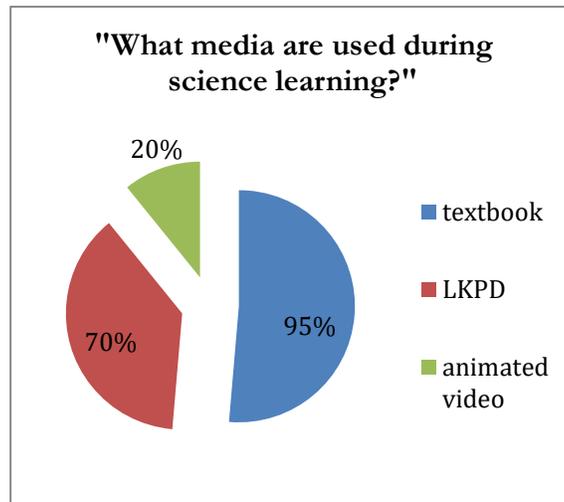


Figure 10. Diagram of Learning Resources Used by the Students

Based on Figure 10, the results show that 95% of students use textbooks, 70% use student worksheets (LKPD), and 20% use animated videos as learning resources. Learning resources or teaching materials should facilitate students in understanding the learning material, as teaching materials play an important role in the learning process and can support the learning success of both school and university students (Ardiansyah et al., 2016).

It is known that students of MTs An Najah Pekanbaru have never used e-modules during science learning. This can be seen in Figure 11.

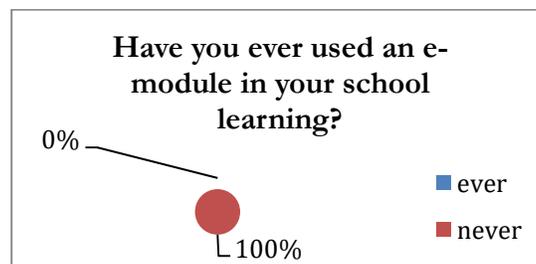


Figure 11. Graph of students' experience in using e-modules

Based on Figure 11, there are students who have never used learning resources such as e-modules in the learning process. Through e-modules, students will explore interesting and interactive learning resources that satisfy their curiosity, as well as provide a solution for students to wisely utilize information and communication technology. This aligns with Abd Muis et al. (2022), who stated that the availability of learning resources and media must correspond with the development of the Industry 4.0 era, which is interactive and engaging. Educational institutions must have flexibility in accessing the development of learning resource information.

However, despite this, teachers continue to provide the best learning experiences for their students during the science learning process. This is reflected in several methods applied by teachers during science lessons. All students stated that their science teacher in Grade 7 always instills motivation and informs the learning objectives, connects the material to be studied with students' prior knowledge, provides opportunities for discussion and questions during the learning process, gives summaries or short quizzes containing the studied material, and



reinforces the material learned. This corresponds with the findings of Rohmawati et al. (2018), which stated that a teacher, in carrying out their professional duties, is required to be a proper and effective role model for students, so that students can improve their academic achievement while enhancing the quality of education they receive from that teacher.

The introduction of innovative teaching materials is necessary to increase students' interest, motivation, and learning outcomes. Since e-modules are not yet used at MTs An Najah, this product can be developed for the school. In its presentation, the e-module will not only display the material but will also link it to socio-scientific issues and integrate verses from the Qur'an and hadiths. This can be seen in Figure 12 and Figure 13.

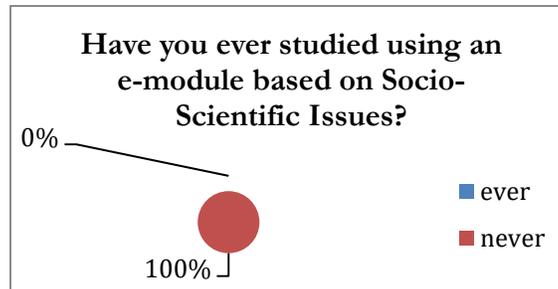


Figure 12. Graph of students' experience with the Socio-Scientific Issues e-module

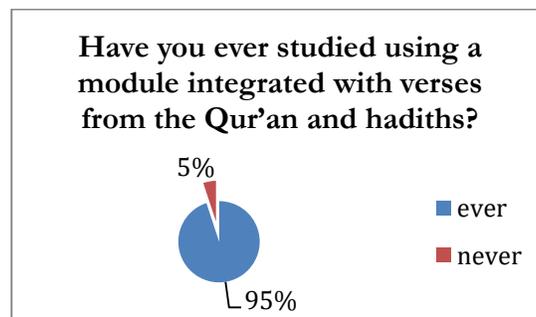
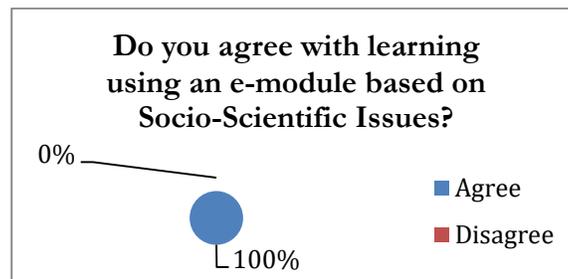


Figure 13. Graph of students' experience with the e-module integrated with verses from the Qur'an and hadiths

Figures 12 and 13 show that 100% of students stated they have never studied using an e-module based on socio-scientific issues, while 95% of students stated they have studied using a module integrated with verses from the Qur'an and hadiths.

A module is one of the teaching materials that contains complex concepts and instruction, using language that is easy to understand so that students can study independently (Rohmawati et al., 2018). The use of e-modules based on socio-scientific issues on SSI topics presents situations that provoke questions about the potential impact of certain actions related to welfare, economy, or social norms. The scientific and social dimensions create many open-ended questions and provide many opportunities for ongoing investigation (Sari, 2019). Meanwhile, the e-module integrated with verses from the Qur'an and hadiths can increase students' faith and piety to God Almighty, as all knowledge is sourced from the Qur'an (Bakri et al., 2015).

The provision of engaging teaching materials is desired by students as additional learning resources during science lessons. This can be seen in Figure 14.



**Figure 14. Graph of the need for e-module development as teaching material**

Figure 14 shows that 100%, or all students, agree with the development of an e-module based on socio-scientific issues as a learning resource. The use of e-modules as learning resources is indeed very helpful in understanding the material, besides being easy to comprehend. The use of illustrations in the module can attract students' attention. This is also reflected in the students' questionnaire, where they expressed that the textbooks they want are those with many pictures, concise and easy-to-understand explanations, and practical content.

Using modules as teaching materials or other learning resources offers several advantages, including: (1) providing immediate feedback; (2) being adaptable to individual students' abilities by allowing freedom to determine the pace of learning and understanding, as well as the form and content of the material; (3) after evaluation, both teachers and students can identify which parts of the module students have successfully mastered and which parts still need improvement; and (4) students achieve learning objectives according to their capabilities (Bakri et al., 2015).

Moreover, the development of an e-module based on socio-scientific issues integrated with verses from the Qur'an and hadiths can help students understand the connection between social environmental issues and science, as well as enhance students' religiosity.

#### 4. CONCLUSION

This writing has described the results of the needs analysis for the development of a science e-module for junior high school/MTs based on Socio-Scientific Issues (SSI) integrated with verses from the Qur'an and Hadith on the topics of Earth's layers and disasters, based on curriculum analysis and needs analysis of students and teachers. The uniqueness of this science e-module is that the science learning is linked to social issues related to science (socio-scientific issues) as well as science material integrated with verses from the Qur'an and Hadith. This e-module can be developed after analyzing the curriculum, distributing student needs questionnaires, and conducting interviews with science teachers. The results of this development are expected to serve as a reference for further research on e-module development models.

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